Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. In each of the following examples, identify the factor that affects the rate of the reaction

described;

(a) Gold and copper are both used in jewellery, but copper bracelets will turn green over time.

(b) Milk kept in a refrigerator will keep for a week or more, but milk left out on the counter will

quickly turn sour.

(c) Papain is a food additive that is sometimes added to meat to make it more tender.

(d) The dust from grain silos has been known to explode, whereas kernels of grain are almost

nonflammable.

(e) Vinegar is safe to add to food and consume, but pure acetic acid will burn skin on contact.

2. The reaction among permanganate, iron (II), and hydrogen ions occurs in aqueous solution as

follows:

MnO4-(aq) + 5 Fe2+(aq) + 8 H+(aq) Mn2+(aq) + 5 Fe3+(aq) + 4 H2O(l)

Given that the rate of this reaction is 4.0 x 10-2 mol/L MnO4-(aq) consumed per minute,

calculate and express the rate of reaction with respect to each of the other reactants or

products in the equation

3. Use the data from Table 14.3 to establish the order of reaction with respect to HgCl2 and

C2O42- and also the overall order of the reaction.

2 HgCl2 + C2O42- 2Cl- + 2 CO2 + Hg2Cl2

Table 14.3: The Kinetic data

|  |  |  |  |
| --- | --- | --- | --- |
| Experiment | [HgCl2], M | [C2O42-], M | Initial rate, M min-1 |
| 1 | 0.105 | 0.15 | 1.8 x 10-5 |
| 2 | 0.105 | 0.30 | 7.1 x 10-5 |
| 3 | 0.052 | 0.30 | 3.5 x 10-5 |

4. The initial rate of the reaction A + B C + D is determined for different initial conditions,

with the results listed in the table.

(a) What is the order of reaction with respect to A and to B?

(b) What is the overall reaction order?

(c) What is the value of the rate constant, K?

|  |  |  |  |
| --- | --- | --- | --- |
| Experiment | [A], M | [B], M | Initial rate, M s-1 |
| 1 | 0.185 | 0.133 | 3.35 x 10-4 |
| 2 | 0.185 | 0.266 | 1.35 x 10-3 |
| 3 | 0.370 | 0.133 | 6.75 x 10-4 |
| 4 | 0.370 | 0.266 | 2.70 x 10-3 |

5. Molecular iodine dissociates at 625 K with a first-order rate constant of 0.271 s-1. What is the

half-life of this reaction?